Citation:

Rodriguez C, McCullough ML, Mondul AM, Jacobs EJ, Chao A, Patel AV, Thun MJ, Calle EE. Meat consumption among black and white men and risk of prostate cancer in the Cancer Prevention Study II Nutrition Cohort. *Cancer Epidemiol Biomarkers Prev* 2006; 15(2):211-216.

PubMed ID: 16492907

Study Design:

Prospective cohort study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

The purpose of this study was to investigate the association between unprocessed red meat, processed meats (separating lunch meats and cooked processed meats), and poultry intake among White and Black men in relation to prostate cancer incidence.

Inclusion Criteria:

Participants were recruited from the Cancer Prevention Study II Nutrition Cohort.

Exclusion Criteria:

Exclusion criteria included the following:

- Men who were lost to follow-up (N = 3,489);
- Presence of any prevalent cancer (except melanoma skin cancer) (N = 9,001);
- Inability to verify those whose self-report of prostate cancer from the 1997 questionnaire (N -217);
- Men with Stage A_1 prostate cancer (N = 52);
- Men with extreme energy intake values (<600 or >4,500 kcal/day) and those with missing or uninterrable data for meat and other dietary intake in 1992 (N = 7,230); and
- Men who were of a race other than White or Black (N = 877).

Description of Study Protocol:

Recruitment

Participants were recruited from the Cancer Prevention Study II Nutrition Cohort.

Design

At enrollment in 1992, participants completed a self-administered questionnaire that included demographic, medical, behavioral, environmental, occupational and dietary factors. Follow-up questionnaires were sent to participants in 1997, 1999 and 2001, to update exposure data and ascertain recently diagnosed cancers. The follow-up period ended on August 31, 2001.

Statistical Analysis

Cox proportional hazards modeling was used to examine the association between different measures of meat intake and incident prostate cancer separately among Black and White men. All Cox models were stratified on single year of age at enrollment and were adjusted for total energy intake.

Data Collection Summary:

Timing of Measurements

Participants completed a self-administered questionnaire that included demographic, medical, behavioral, environmental, occupational and dietary factors at study entry in 1992. Follow-up questionnaires were sent to participants in 1997, 1999 and 2001, to update exposure data and ascertain recently diagnosed cancers. The follow-up period ended on August 31, 2001.

Dependent Variables

- Incidence of prostate cancer: Identified initially through a self-report of cancer on any of the questionnaires and subsequently verified by medical records or by linkage to a cancer registry.
- Meat intake: Dietary intake in 1992 was assessed using a 68-item modified brief food-frequency questionnaire; nutrient values and consumption frequencies were estimated using Dietary Analysis System version 3.8a.

Independent Variables

Death due to prostate through linkage with National Death Index (N = 92).

Description of Actual Data Sample:

Initial N: N = 65,590 (all males

Attrition (final N): N = 65,590

Age: Aged between 50-74 years old at entry in 1992.

Ethnicity: Black (N=693) and White (N = 64,897)

Other relevant demographics: Not described

Anthropometrics (e.g., were groups same or different on important measures): Not described

Location: Multisite (21 states; specific states not described)

Summary of Results:

Key Findings

- On average, Black men reported a higher median intake of processed meat than White men (129 vs. 92 g/wk, respectively), lower median intake of processed meat (244 vs. 311 g/wk, respectively) and higher median intake of poultry (164 vs. 144 g/wk, respectively)
- Bacon and sausage accounted for much of the difference in consumption of processed meats between Black and White participants (median intake of bacon and sausage was 14 and 29 g/wk, respectively, among Black men and 5 and 8 g/wk among White men)
- Black and White men in the highest category of processed and unprocessed red meat intake were younger, less educated, had a higher body mass index (BMI) and were more likely report diabetes and a diet high in calories
- Black and White men in the highest poultry consumption quintile were more educated and more likely to report diabetes and a diet high in total calories
- Men in the lowest category of unprocessed red meat or processed meat intake and the highest category of poultry were more likely to report ever having had a PSA test during the study follow-up period (78% Black men and 83% White men)
- Total red meat intake (includes processed and unprocessed red meat) was associated with a higher incidence of prostate cancer among Black men
- There was no association seen between total red meat consumption and incidence of prostate cancer

Author Conclusion:

The authors concluded that greater intake of meat may contribute to higher prostate cancer risk in American Black men.

Reviewer Comments:

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes

4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	No
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	No
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	Yes
6.6.	Were extra or unplanned treatments described?	Yes
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes

7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	No
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	Yes
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes